

**REMARKS:**

Claims 1-16 are in the case and presented for consideration.

Applicant has amended the title of the invention herein to better indicate what is the nature of the invention to others. In particular, as discussed further below, the cooperative nature of the agents is important to the operation of the system and method to produce results in a time-efficient manner.

Claims 1 and 5 are amended to explicitly recite that the co-evolutionary agents are cooperative co-evolutionary agents, in order to distinguish them from competitive agents. Claims 3 and 7 are amended to correct a problem with antecedent basis noted by applicant and for no other reason related to patentability.

Also, new claims 9-16 are presented to seek protection for a system embodying the method now recited in claims 1-8. Consideration of claims 9-16 is respectfully requested.

As two additional independent claims are being added by this amendment, there are now four independent claims in the application. Accordingly, the Commissioner is hereby authorized to charge our firm Deposit Account No. 14-1431 in the amount of \$43.00 as payment of the fee now due pursuant to 37 C.F.R. §1.16(b), reduced by half for applicant's small entity status. The Commissioner is further hereby authorized to charge or credit any under or overpayment of fees now or hereafter due pursuant to 37 C.F.R. §§1.16 or 1.17 in connection with this application.

Claims 1-8 were rejected pursuant to 35 U.S.C. §102 as anticipated by the disclosure contained in an IEEE Proceedings article naming F. Seredynski as the author ("Seredynski"). Applicants respectfully traverse the rejection of claims 1-8 as amended, and, further, submit that all of claims 1-16 are patentable over the Seredynski reference, as well as the other references of record in this case. Applicants respectfully submit that

there are significant differences between the invention as claimed and the Seredynski reference.

Initially, applicants wish to point out that the method and system of Seredynski utilizes a **competitive** coevolutionary algorithm (see p. 432, col. 2, lines 16-21), rather than a **cooperative** co-evolutionary algorithm as now recited in the independent claims. The algorithm of Seredynski is based on game theory models of interaction, which are by definition, competitive. Applicants observe that competitive and cooperative systems and methods are viewed as distinctly different approaches by those of ordinary skill in the art of the invention. And, Seredynski notes that others have proposed cooperative approaches, but he discards cooperative approaches as unacceptable compared to the competitive approach described in the article. See p. 432, col. 2, text following heading B.

A second important distinction between Seredynski and the claimed invention is that Seredynski uses competitive game theory to produce solutions that generate payoffs based on a determination of the quality of the solution. The agents in Seredynski share payoff information to affect current payoffs at other nodes. In contrast, the method and system of the invention shares decision information, in the form of solutions, between agents. Sharing the decision information does not affect current solutions; rather, future decisions and solutions are affected. The claimed method permits near instantaneous receipt of global feedback at each node as a result of sending decision information between nodes. At the same time, the locally obtained solutions are used individually by each agent to update the cooperative coevolutionary agent. That is, the current outcome is not affected by the updating or decision making in the claimed invention, while in Seredynski, it is.

Further, in the claimed invention, the decision information is shared according to a selected coordination scheme. The coordination schemes are all based on explicitly using

global performance of the distributed agents. Seredynski, in comparison, only observes the global performance, but does not use the global performance of its agents to affect any decision making.

Seredynski provides a system for agents to share payoff information according to a local or global scheme, and may compute a local payoff based on a locally defined function. The current payoff is a temporary solution, however, and is modified by information about other payoffs. The claimed method and system, however, give a mechanism to each coevolutionary agent in the form of the mobile agents, for immediately computing global payoffs at each node. That is, each agent receives its global performance as feedback via the mobile agents. At the same time, the freedom of the coevolutionary agents is restricted to the use of the primary search variable for the agent.

Seredynski does not provide for any interaction with network-distributed databases for retrieving information. The co-evolutionary architecture of the method and system of the invention, however, utilizes a database which is spread across the network, with each agent having access to a local portion of the distributed database. This feature is recited in each independent claim.

These differences cause the Seredynski system to produce a more limited set of optimized solutions than the one claimed by applicants. Seredynski is useful only in applications having favorable objective (payoff function) properties, and particularly, additively decomposable objectives where optimizing on localized views will still help from a global perspective, and problems where coupling between nodes is non-existent or at best, minimal. The claimed invention, in contrast, can be used to solve problems having a high degree of coupling or complex non-linearities. The claimed invention is not subject to the problem of having to a priori determine globally consistent, localized payoff functions

or unreasonably assuming that coupling does not exist in the problem being solved.

These distinctions are found in each of the four independent claims now in the case – claims 1, 5, 9 and 13.

Additional differences are found in the dependent claim limitations.

In particular, in claims 4, 8, 11, 12, 15 and 16, alternate ones of specific schemes for coordinating the actions of the mobile agents are recited. None of these schemes are disclosed in Seredynski; the referenced section does not mention any one of these schemes.

Considering the several differences between applicants' claimed invention and the method described in Seredynski, it is apparent that two clearly different methods are claimed and described, respectively. The Seredynski method has different steps and provides results in a different manner than the claimed invention, most notably by using competitive agents rather than cooperative agents.

In view of these several differences, applicants submit that the Seredynski reference does not anticipate the invention as claimed in any of claims 1-16. And, due to these same differences – most notably the competitive versus cooperative approach taken in Seredynski – applicants submit that the invention as claimed is not obvious from Seredynski, taken alone or in combination with any of the other available references.

Accordingly, the application and claims are believed to be in condition for allowance, and favorable action is respectfully requested. No new matter has been added.

If any issues remain which may be resolved by telephonic communication, the Examiner is respectfully invited to contact the undersigned at the number below, if such will advance the application to allowance.

Favorable action is respectfully requested.

Respectfully submitted,



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